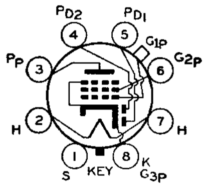


RCA-6B8



DUPLEX-DIODE PENTODE

The 6B8 is an All-Metal type of tube consisting of *two diodes* and a *pentode* in a single envelope. It is recommended for service as combined detector, amplifier (radio-frequency, intermediate-frequency or audio-frequency), and automatic-volume-control tube in radio receivers. For diode-detector considerations, refer to page 26.

CHARACTERISTICS

HEATER VOLTAGE (A. C. or D. C.)	6.3	Volts
HEATER CURRENT	0.3	Ampere
GRID-PLATE CAPACITANCE*	0.005 *max.*	μμf
INPUT CAPACITANCE*	6	μμf
OUTPUT CAPACITANCE*	9	μμf
CAP		Miniature
BASE		Small Wafer Octal 8-Pin

* With shell connected to cathode.

Pentode Unit—As Class A_1 Amplifier

PLATE VOLTAGE	250 *max.*	Volts
SCREEN VOLTAGE (Grid No. 2)	125 *max.*	Volts
GRID VOLTAGE (Grid No. 1)**	−3	Volts
PLATE CURRENT	10.0	Milliamperes
SCREEN CURRENT	2.3	Milliamperes
PLATE RESISTANCE	0.6	Megohm
AMPLIFICATION FACTOR	800	
TRANSCONDUCTANCE	1325	Micromhos
GRID BIAS VOLTAGE (Approx.)†	−21	Volts

† For cathode current cut-off.
** The value of the resistance in the grid circuit should not exceed a maximum of 1.0 megohm.

Diode Units

Two diode plates are placed around a cathode, the sleeve of which is common to the pentode unit. Each diode plate has its own base pin. Operation curves for the diode units are given under type 6B7.

INSTALLATION

Refer to INSTALLATION on the type 6A8.

APPLICATION

The 6B8 is recommended for performing the simultaneous functions of automatic-volume-control, detection, and amplification.

For **detection,** the diodes of this tube may be utilized in a full-wave circuit or in a half-wave circuit. In the latter case, one plate only or the two plates in parallel may be employed. The use of the half-wave arrangement will provide approximately twice the rectified voltage as compared with the full-wave arrangement.

For **automatic-volume-control,** a rectified voltage which is dependent on the r-f or i-f carrier is usually employed. This voltage may be utilized to regulate the gain of the r-f and/or i-f amplifier stages so as to maintain essentially constant-carrier input to the audio detector. Refer to discussion of automatic-volume-control methods on page 28.

The complex structure of the 6B8 permits of obtaining automatic-volume-control voltage in a number of ways. In one case, the required voltage is obtained from the detector circuit by utilizing the voltage drop caused by the rectified current flowing through a resistor in the detector circuit. In another case, the required voltage is obtained by utilizing one diode for the sole purpose of automatic-volume-control. This latter method is of particular interest since it confines the sensitivity and time-delay function to the avc circuit. Time-delay action is determined by the use of a resistance and condenser combination having the desired time constant. The avc action may be postponed by applying a negative voltage to the avc diode plate. Another avc arrangement capable of various adaptations is to use the pentode as a d-c amplifier to supply the regulating voltage.

For **r-f or i-f amplification,** the pentode unit of the 6B8 may be employed in conventional circuit arrangements. It is designed so that its cut-off is somewhat extended to permit of moderate gain control by grid-bias variation without introducing cross-modulation effects. The cut-off point and the ability to handle the larger signals may be altered by choice of screen voltage to suit the requirements of the circuit. To assist in making this choice, different operating conditions for representative screen voltages are given under CHARACTERISTICS.

For many types of circuits a convenient and practical method of obtaining the desired benefit of the extended cut-off is to supply the screen voltage from a high-voltage tap through a series resistor. This arrangement provides automatically an increase in the voltage applied to the screen as the grid-bias is made more negative, with the result that the maximum signal-handling ability is obtained. When this method is used, the voltage applied to the screen should be limited to 125 volts for −3 volts grid-bias and to 200 volts for more negative values of grid-bias.

For **a-f amplification,** the pentode unit of the 6B8 may be used in a resistance-coupled circuit arrangement to provide high gain under operating conditions given in the Resistance-Coupled A-F Amplifier Section.

Typical duplex-diode pentode circuits are shown under type 6B7. When the 6B8 is used in these circuits, its shell should be connected to ground.

